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than the futility of trying to determine a good double-star orbit from a short observed arc. It is seldom indeed that observations covering an arc of less than 180° will yield a reliable orbit, and it is safe to say that for most double stars an observed arc of at least three quadrants is necessary.

The number of well-determined binary-star orbits will be increased most rapidly by careful and systematic observations of the stars that have already shown considerable motion,—especially such pairs as β 80, β 513, β 648, Ho 212 etc,—and of the very close pairs of more recent discovery.

November 6, 1905.

R. G. AITKEN.

OBSERVATIONS OF THE ECLIPSES OF SATURN'S SATELLITES.

More than a year ago Professor HERMANN STRUVE called attention* to the "cycle of eclipses and other phenomena of the satellites of *Saturn*" which began in 1904 and will extend over the next three years, but I have seen, so far, no published record of any observations of these eclipses. The following data may therefore be of interest:—

1905, Oct. 18; 36-inch telescope, power 350. Reappearance of *Enceladus* from eclipse noted at $15^h 16^m 40^s$ G. M. T. Predicted time,* $15^h 15^m$ G. M. T.

The time was noted when the satellite was seen with certainty. It was suspected nearly 2^s earlier. The sky background was good, but the seeing only fair, the images blurring badly at times.

1905, Oct. 26; 36-inch telescope, power 350. Reappearance of *Tethys* noted at $15^h 30^m 21^s$ G. M. T. Predicted time,* $15^h 29^m$ G. M. T.

Tethys was dimly seen for 5^s before the time noted. Observing conditions about as on Oct. 18.

1905, Nov. 10; 36-inch telescope, power 350. Reappearance of *Tethys* noted at $18^h 5^m 17^s$ G. M. T. Predicted time,* $18^h 4^m$ G. M. T.

The planet was low in the sky at the time of observation, and the seeing not very good. The time noted is the instant the satellite was dimly seen.

On October 28th, and again on November 14th, I tried to

* *Mon. Not. R. A. S.*, Vol. LXIV, p. 813, et seq, 1904.

observe the reappearance of *Mimas* with the 36-inch, but the seeing was poor on both nights, and the satellite was not seen. The search on each night was continued nearly 10^m after the predicted time of reappearance.

An attempt was also made on November 11th to observe the reappearance of *Tethys* with the 12-inch telescope. The seeing was very poor, and the satellite was first seen at 15^h 26^m 9^s G. M. T., the predicted time of reappearance being 15^h 23^m. From this it appears that the satellite was well out of the shadow of the planet before it was observed.

These observations indicate that there is no difficulty in observing the eclipses of any of the satellites of *Saturn*, except *Mimas*, with a large telescope. Under good conditions it would also seem probable that the eclipses of *Mimas* could be observed with the 36-inch telescope and those of *Tethys* with the 12-inch.

R. G. AITKEN.

November 20, 1905.

RETURN OF THE CROCKER ECLIPSE EXPEDITIONS FROM THE LICK OBSERVATORY.

The members of the three expeditions sent out by the Lick Observatory to observe the solar eclipse of August 29-30, 1905, have all reached home safely. Professor and Mrs. HUSSEY, of the expedition to Egypt, arrived at Ann Arbor, Michigan, early in October, and Professor HUSSEY at once entered upon the duties of his new position there.

Dr. and Mrs. H. D. CURTIS, of the expedition to Labrador, arrived at Mt. Hamilton on October 19th, and the members of the expedition to Spain, Director and Mrs. CAMPBELL and Dr. and Mrs. PERRINE, arrived on November 22d and November 20th, respectively.

Dr. CURTIS's account of work at the Labrador Station will be found on another page. Accounts of the other two expeditions will follow in our next number.

R. G. A.

VARIABLE ASTEROID (167) *URDA*.

The asteroid discovered August 23d by Professor MAX WOLF, and designated 1905 QY, on the assumption that it was new, was found by Dr. PALISA to be variable and very likely